Eaton Helps Boost Capacity of Panama Canal

Customer
Panama Canal Upgrade Project

Markets Served
Civil Projects, Off Shore, Marine, Dredging

"The magnitude of our efforts and the manpower behind them show we can go beyond supplying components by handling complete turnkey projects."

Bob Tripp, Eaton Area Sales Manager

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Background
Thanks to Eaton, the historic Panama Canal will offer smoother sailing.

Since 2004, Eaton's Hydraulics business has been working on a $13-million project to upgrade the canal's water-flow control system. The project marks the largest Industrial systems contract ever awarded to Eaton.

Eaton is the primary contractor for the five-year project to boost the canal's transit capacity by approximately 20 percent.

The Panama Canal is a vitally important passageway for all navigation between the Atlantic and Pacific Oceans. In fact, since its opening in 1914, some 900,000 ships have passed through the canal.

The canal has three sets of locks—Miraflores Locks, Pedro Miguel Locks, and Gatun Locks—that bridge uneven waters by lifting ships 85 feet to the level of Lake Gatun and lowering them back to sea level.

Water levels in the locks are controlled by a complex system of culverts and rising stem valves. To modernize mechanisms dating back 90 years, Eaton's Hydraulics business is supplying 116 new systems consisting of a number of custom-designed Eaton products. These include Vickers™-brand hydraulic power units and special Hydrowa®-brand cylinders that will improve lock operation and reduce maintenance.

Challenge
Besides supplying components, Eaton is supervising their installation as well, a job that included tackling the problems of removing old equipment and welding new components to unknown materials nearly a century old. Assisting in the tremendous task were Paul Smith industrial systems manager, and Engineers Marty Collison and Dave Follebout.

"Winning the contract was a great accomplishment," said Bob Tripp, Eaton area sales manager in the canal area, "however, providing installation and fabrication—including rigging, welding, mounting, positioning, and interfacing controls and commissioning startup—was another achievement in itself.

"Key concerns of the Panama Canal Authority were how to get the equipment down inside the walls of the canal, cut out

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and remove the old system, and weld and mount the new system into place.

Solution
"It was a huge task, but we overcame the project risks thanks to members of our project team. Their in-depth research into installation requirements and their ingenuity are enabling us to get the job done.

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Tripp notes that Smith and Eaton Hydrowa Engineers Erwin De Bresser and Erik Hoogakker were instrumental in putting together a winning, well-thought-out system proposal.

"Although our proposal was extremely technical in detail, we wrote it with the spirit of cooperation, flexibility, and communication that we sensed the Panamians desired.

"We included system alternative ideas, design improvements, suggestions, and technologies that went above and beyond the original project specifications, but which we believed could be of benefit. And since the project spans five years, we included modification and improvement provisions as new technologies and product developments become available."

Results
Specific Eaton products being utilized successfully in the project include:

Vickers custom stainless steel power units—Used to power vertically mounted cylinders that open and close

the canal's rising stem valves, which control water flow through the culverts. Each unit has a redundant-style, dual 30-horsepower electric motor pump grouped with Eaton's new Series PVM050 load-sensing, pressure-compensated 50cc variable displacement piston pumps.

Eaton custom Hydrowa cylinders with Altiox 300-rod coating and integrated magnetostrictive-type position sensor—Connected to submersed valves under brackish water. Specified for total immersed operation, the cylinders incorporate 260-mm (10.2-inch) bores, 180-mm (7.1-inch) rods, and 5,486-mm (216-inch) strokes, with backup limit switches and cushions.

Custom steel-control manifold, consisting of Vickers slip-in cartridge valves and a patented Valvistor® EPV16 proportional valve—Developed to provide optimal control and positioning over the cylinder.

Vickers contamination control products, including HF3P, OFRT850, and OF3 filters — Applied to maintain the entire system at ISO cleanliness of 17/15/3 or better, ensuring long component life.

Eaton products are being supported for the project through Protecsa, an Eaton products distributor located in Panama City.

Eaton's Electrical products are also playing a role in the canal's renovation. Canal officials originally ordered 80 Cutler-Hammer PanelMate electronic operator interfaces. These controllers monitor and control the locks.

Canal officials were pleased with their performance, but that didn't prevent competitive challenge. Eaton responded by making a strong case for the PanelMate controllers, which offer more processing capacity than the competitive product. The result: canal engineers kept the existing PanelMates and ordered 75 more.

Tripp says Eaton's Panama Canal achievements as supplier and project manager bode well for future business in the canal region and elsewhere.